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22 July 1955

TIME LAPSE CAMERA, 35mmThe Camera Case

The shape of the camera nearly like a cigar box. Metal construction, light in weight and non-shatterable. The corners and edges will be rounded.

The color of all outside parts of the camera, tripod, battery case, wire leads, plugs, view finder, lens barrel and magazines will be black or very dark.

The coefficient of the metal for all moving or removable parts particularly in attaching or detaching the lens to the camera case will not "stick," "bind," or "freeze" in temperatures from 32 degrees to 150 degrees F., and wheresoever practical, ball bearings be used for moving parts. The moving parts held to a minimum, and such moving parts noiseless. The camera shall operate without oil in cold climates and should certain parts require oil, they must be marked. The parts oiled be flushed out when necessary. The best quality of watch oil used for lubrication.

The metal for the camera case and magazines shall be malleable. The thickness of the metal for the camera case shall not be over 3/16th nor less than 5/32nds of an inch, likewise the battery case, and they shall both be water and moisture proof including electrical connections thereto. The metal used in the camera case and magazines will be capable of protecting very fast emulsions including infrared.

and, wheresoever practical,

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And, wheresoever practical, all inside parts anodized black. Every effort will be made to make the camera fungus proof and SOUNDPROOF.

Screws or bolts that hold removable plates to the camera in order to repair the electrical circuit or other parts of the camera must remain on the plates after taken off. This is to prevent dropping and losing screws or bolts anywhere.

The door of the camera will be strengthened and piano hinged. It will swing at least 135 degrees to the rear, and held in an open position by a spring pawl. It will lock when closed by 2 cams on the inside camera door that turns 45 degrees. The cams will be turned by a small coin, and marked to indicate direction "Open" and "Close".

The magazines will hold 200 feet of 35mm film. The magazines will be designed to center itself into position in camera and held in proper position by snap springs.

The cover of magazine will not be hinged. Consideration in magazine design is that the majority of magazine loadings will be in a changing bag. The cover must be easily taken off and on without a special tool. Snap springs with a small hole not more than 1/8th of an inch, sliding over a pin on the magazine case, is suggested. Ball bearings on shafts holding unexposed and exposed film. Positive and even winding on takeup spool must be maintained to prevent film creeping from side to side or binding against the magazine.

To keep the camera small, consideration in magazine design is essential. ~~The exposed film should progressively take the place of~~

~~unexposed film.~~

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~~unexposed film.~~ <sup>1.4</sup> ~~Three~~ magazines for each camera.

Provision to advance unexposed film into position when the first picture is made.

Attachment of camera to tripod:

One female thread placed in the center of ballance at camera base.

One female thread placed in the center of ballance at camera top.

One female thread placed in the center of ballance at camera right side.

The American thread used in tripods. An adjustable device whereby the camera can be mounted to a tree, post, telephone pole or other wooded structure. The device flexible enough to allow the operator to accurately aim camera and lock from any of the above three holding positions.

A level with two bubbles at right angles placed on top of camera. The level will be used when the camera is not on tripod. The tripod can be obtained commercially. It must have the following: Tabular leg extension of rather heavy metal for rigidity. Steel points on the leg ends. The legs adjustable and locked at the desired height. The head of the tripod in proportion to camera base for balance. The tripod will tilt and pan and have a locking device which holds the camera at various angles. All bright metal on tripod anodized black. The tripod will have a level with two bubbles at right angles. A spreader to hold tripod and camera when used on hard surfaces. A chain, separated by a turnbuckel, and the chain suspended from the tripod head and long enough to reach the floor when tripod is fully extended on spreader. A hook that can be screwed into a wooden floor and the chain attached which will help reduce vibration to tripod and camera.

The chain

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The chain will also assure safety of camera movement when not attended. The chain, hook, spreader, turnbuckle color will be black.

#### Lenses

Not more than eight nor less than six quality lenses will be provided. The Leica series is considered an excellent choice. The focal length will be the shortest possible to put on the camera to the longest Leica length with additional support.

These lenses will be coated and carefully selected for quality. Each lens will have a sunshade or hood. These lenses are to be mounted to the camera using the regular Leica thread. This is to provide replacement from the commercial field if any of the lenses become damaged, lost, or in use in other Leica cameras. Such lenses can be obtained practically anywhere in large cities throughout the world. The Leica mounts have remained constant for years, and are not likely to change in the foreseeable future. Leica has already perfected a method of mounting lenses to their cameras and they can be changed readily without sticking or binding because of temperature change.

#### Filters

A behind-the-lens slot will be provided in the camera case that will hold a thin metal frame in which gelatin filters are placed. This slot will be somewhat like that provided in Eyemo cameras.

Four filter frames will be provided for each camera.

The use of gelatin filters are preferable over glass filters for several reasons. The thickness of glass filters effects the focal

length of a lens

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length of a lens as the focal length increases. The diameter of optical glass of A and B quality varies from 14mm in A glass to 2.7 in B glass. The thickness of gelatin filters is less than one mm. Providing different size glass filters for all lenses is not practical, whereas one size behind the lens filter will suffice for all lenses. Gelatin filters can be obtained readily and cheaply worldwide. Although gelatin filters must be handled very carefully when cutting to fit the metal frame, they will be protected from the elements when placed inside the camera whereas the glass filters would be difficult to mount for all lenses and hard to protect from the elements if placed in front of the lens. Again a behind the lens filter is more efficient than filters in front or between lenses. Packages of four inch square gelatin filters will be provided. A five inch pair of good scissors will be provided to cut the gelatin squares. The filter frames will be housed inside the camera for protection against denting or bending when not in use.

Four inch square gelatin filters will be provided of the following: K-2, K-3, 23A, 25, and ND2. The format of the filter holders will be slightly larger than the camera format. The filter frame will fit snugly into camera slot when in use. The snugness of filter frame in camera slot will be finger pressure when inserting or removing.

#### Shutter

A good grade self-setting shutter with speeds up to 400ths of a second or faster, including Time and Bulb placed inside the camera behind the lens. The shutter must be reliable and easily replaced after reasonable wear. It should be thin in depth even if the flanges that normally hold

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that normally hold a front and rear element of a lens have to be milled off flush to the shutter body. The various speeds of the shutter will allow the operator to "Stop" any movement normally encountered, particularly when using long focal length lenses. The "Time" setting allows the operator to accurately view the image on the film. (Explained later under View Finder). The various speeds will provide the operator a wider selection of film emulsions for light conditions and subject matter.

#### Format

The format of the negative image will be one (1) inch square. A one inch format will use all the film excluding sprocket holes and provide <sup>12</sup>~~16~~ pictures to a foot of film. There will be no lost space between each picture.

#### Pressure Plate

The pressure plate will have a greater pressure against the base of the film than normally used in professional 35 mm motion picture cameras. The back section of the pressure plate shall ~~swing open to~~ allow focussing and image viewing. This can be done by sighting a tube from the rear camera. Provision shall be made to readily remove the ~~entire~~ rear pressure plate in order to clean dirt and emulsion particles that accumulate <sup>between the</sup> ~~on sides of~~ pressure plates.

Serious consideration should be given to a magnetized pressure plate design that will apply greater uniform pressure against the film than plates using a spring or springs. The Bulova Watch Company makes a camera that exposes 100 pictures a second on 35 mm film, the format is slightly larger

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is slightly larger than one inch square. A magnetic pressure plate is used. Enlargements made from this small negative give better detail sharpness than pictures from a negative of the same size using springs to hold film against the plates.

#### View Finder

The view finder shall be a type that is used on 35 mm professional motion picture cameras. The Wall 35 mm professional motion picture camera uses a system that would be adapted. Although the Wall system is non-detachable from the camera itself, the same principle can be employed that is detachable. The reasoning being that nothing should be left on the outside of camera that will attract attention or increase the overall size.

This type of view finder when held by the operator or on the camera will help him to quickly determine the proper focal length lens for a given object.

#### Exposure Meter

A name brand type of exposure meter that is simple to operate will be provided.

#### Steel Tape

A roll of steel tape, 100 feet in length, will be provided.

#### Changing Bag

A double lined good grade changing bag will be provided.

#### Motors

The motor operating the camera will be sturdy and reliable and mounted in such a manner that it can be quickly removed for repair or replacement.

#### Spare Motor

A spare motor will be provided.

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#### Batteries

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### Batteries

The batteries operating the camera will be contained in a black, water-tight case. The connections and the wire leading from the batteries to the camera will be black and waterproof. The case will be so designed that the batteries can be replaced <sup>AND</sup> or connected correctly. The batteries will be long life and reliable.

### Spare set of Batteries

A spare set of batteries and case will be provided.

### Battery Charger

A small light weight, efficient battery charger will be provided.

### Wire

Three 25 foot lengths of black waterproof wire with black water-tight connections that can be attached in multiple or single lengths to battery and camera. The connections cannot be attached incorrectly.

### Book of Instructions

A complete set of logical instructions on how to operate camera, disassemble camera for repair, assemble camera after repair, photographic identification of all camera parts laid out and grouped with their respective units, identification of all units assembled and placed in their respective order of assembly. Identification of camera assembled, and identification how to load and insert loaded magazine into camera.

### Electrical Circuit Diagram

The book of instructions will contain a complete wiring diagram naming all electrical parts, where the parts are located and how to get to them for repair. The book will contain instructions on how to charge the batteries and all instructions pertaining to charger and batteries.

### Carrying Case

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## Carrying Case

A strong, sturdy leather suitcase of good quality, reinforced at all corners with leather and covered with metal buffers to protect case from damp or wet floors. The case will have two strong leather straps surrounding the outside, strong metal clamps and combination lock to secure lid. The case will be dark in color. Each item for the camera will be compartmented separately. Each lens will be fitted in a chamois bag with a draw cord to protect the lens in the case.

## Time Lapse Sequence

*200 feet of film*

1 second interval	<sup>40</sup> <del>53</del> minutes <del>20</del> seconds	<sup>2400</sup> <del>3000</del> pictures
5 second interval	<sup>3</sup> <del>4</del> hours, <sup>20</sup> <del>25</del> minutes, 40 seconds	
10 second interval	<sup>6</sup> <del>8</del> hours, <sup>40</sup> <del>53</del> minutes, 20 seconds	
15 second interval	<sup>10</sup> <del>13</del> hours, <del>20</del> minutes	
30 second interval	<sup>20</sup> <del>26</del> hours, <del>40</del> minutes	
1 minute interval	<sup>40</sup> <del>53</del> hours, 20 minutes.	

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